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Trust in what's next.

Building a Practical Digital Twin to Address Public Awareness of Sewage Pollution Legislation

NEWEA 2023 Annual Conference & Exhibit | Rajan Ray, Trinnex

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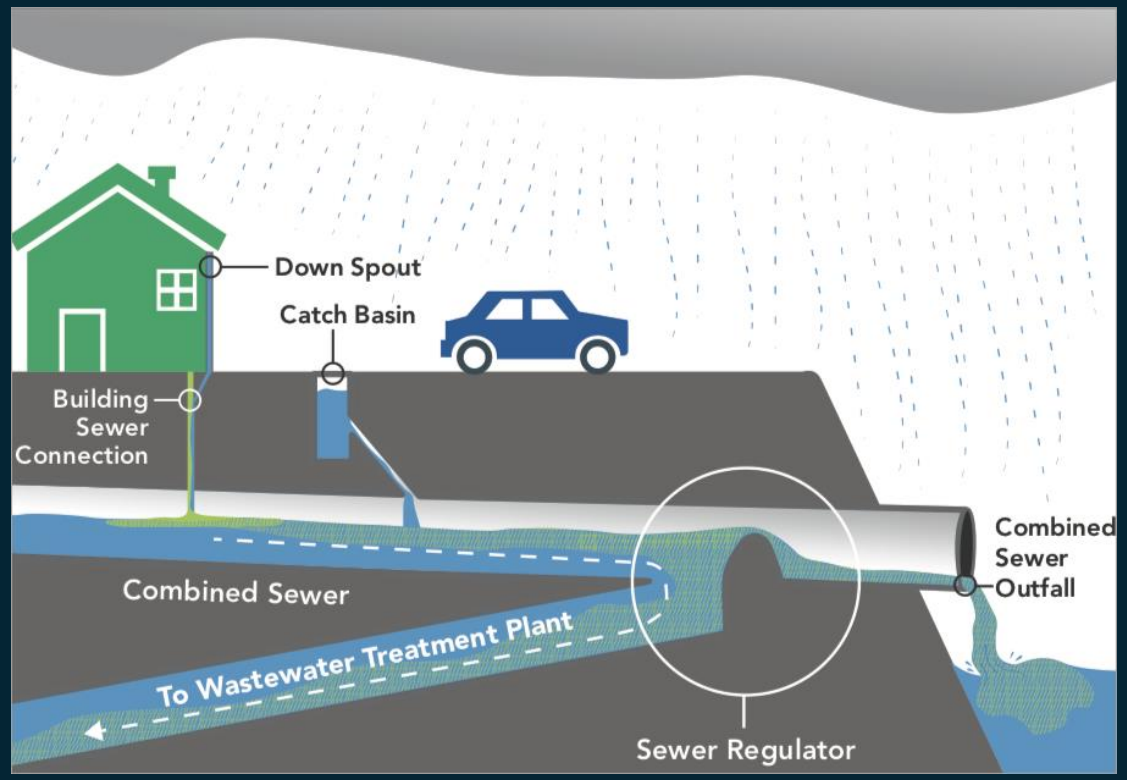
NEW ENGLAND WATER ENVIRONMENT ASSOCIATION
NEWEA
WORKING FOR WATER QUALITY

Thanks to the Forward-Thinking Team at New Bedford

- Jamie Ponte, Commissioner
- Shawn Syde, City Engineer
- Jim Costa, Superintendent
- Justin Chicca, Deputy Commissioner

Combined Sewer Overflows are a priority water pollution concern for ~700 municipalities across the U.S



https://www.nyc.gov/site/dep/water/combined-sewer-overflows.page

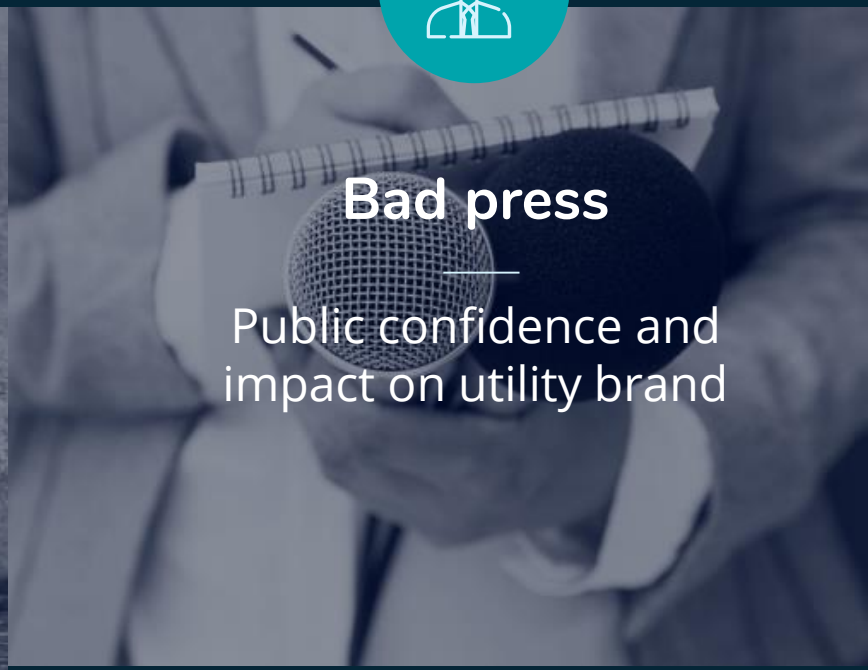
Sewer overflows are challenging on multiple levels from costly fines to impacting public trust

Costly fines

Fines and expensive measures to address fixes

Environment & social impacts

From fisheries to community recreational activities



Bad press

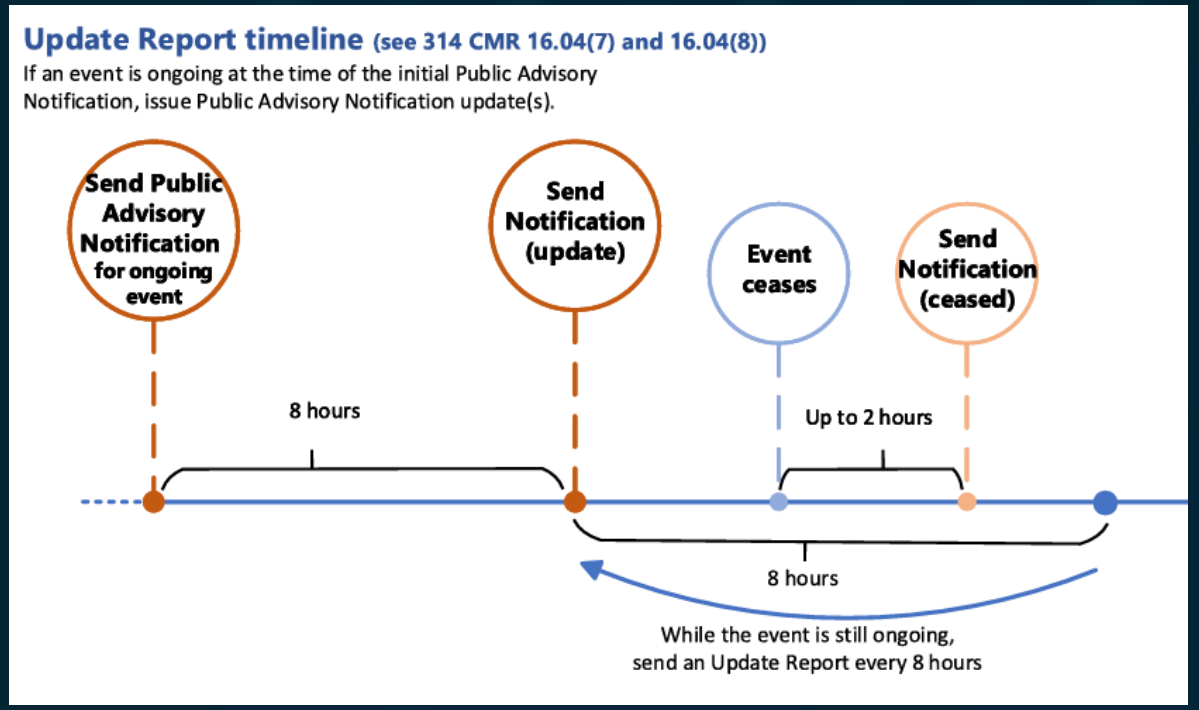
Public confidence and impact on utility brand

314 CMR 16.00: An Act Promoting Awareness of Sewage Pollution in Public Water

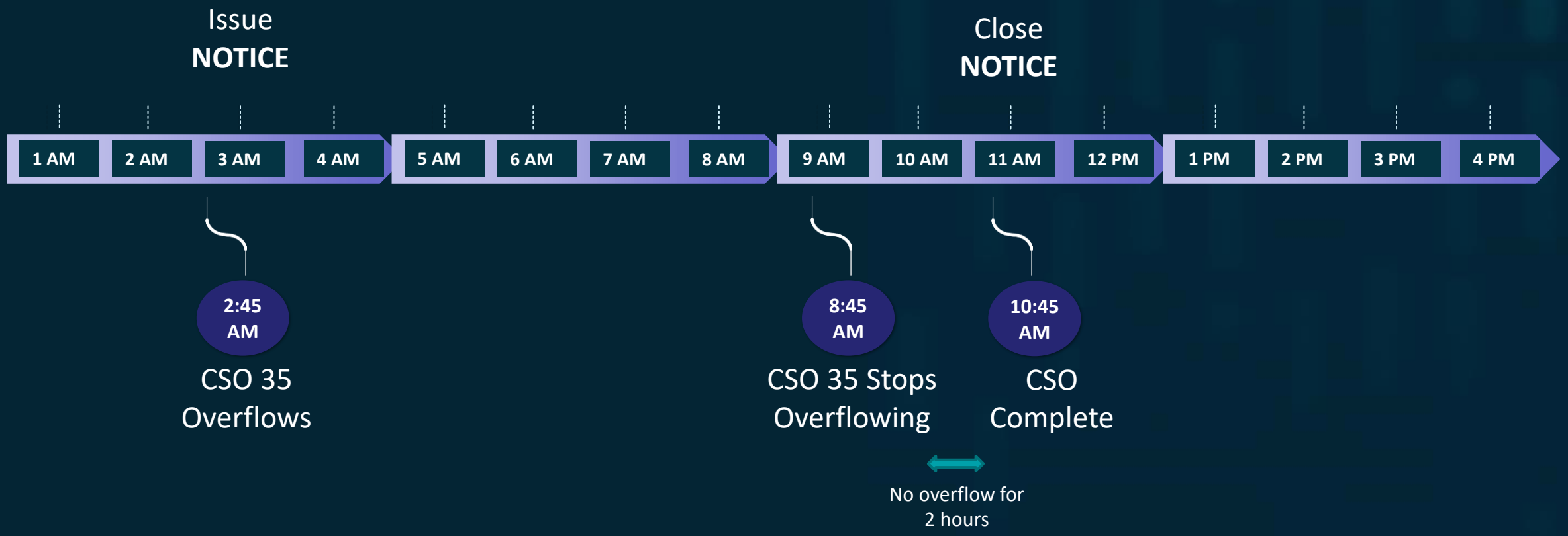
- Effective on July 6, 2022
- Permittees must issue public advisory notifications when there is a discharge from their outfalls that consists of untreated sewage and waste.
- Includes combined sewer overflows (CSOs), sanitary sewer overflows (SSOs), and blended wastewater.

CSO Reporting Requirements

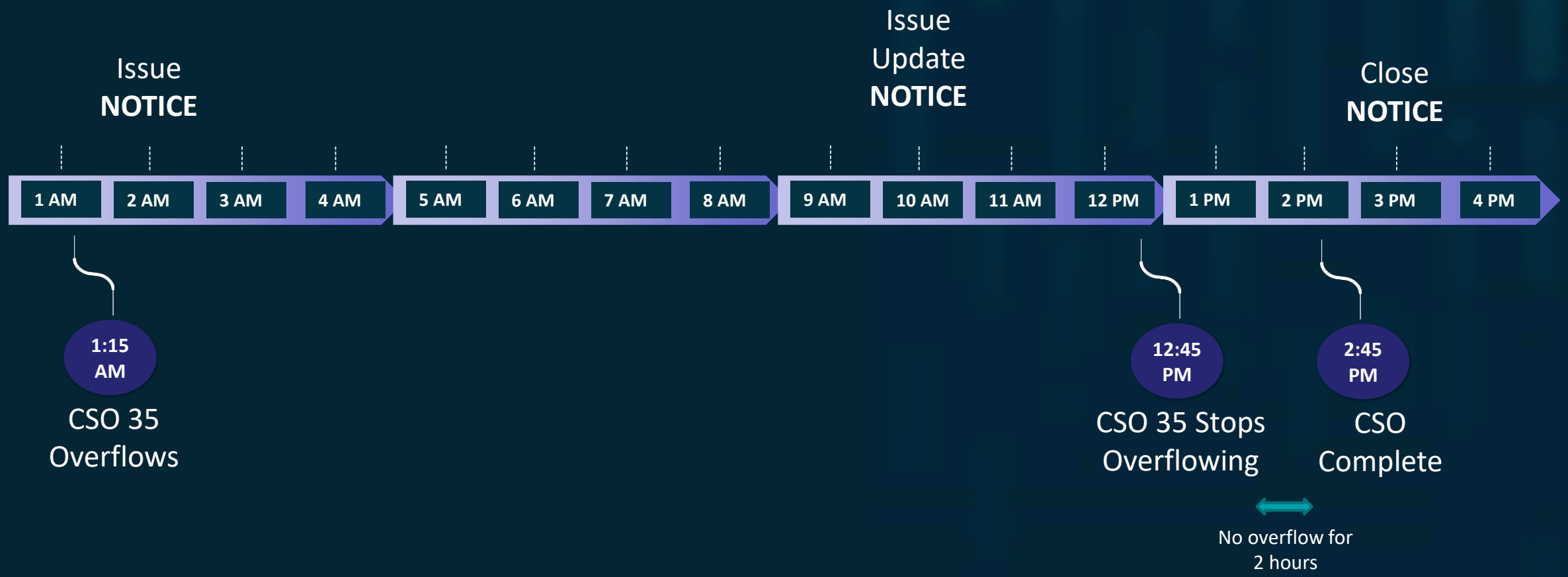
- Public Notification 2 hours after discovery of CSOs
- Ongoing updates every 8 hours if event has not ended
- Event completion update 2 hours after event ends
- Submittal on DEP website 18 hours after initial notification



Example: The dreaded 3am event (an overflow lasting < 8 hours)

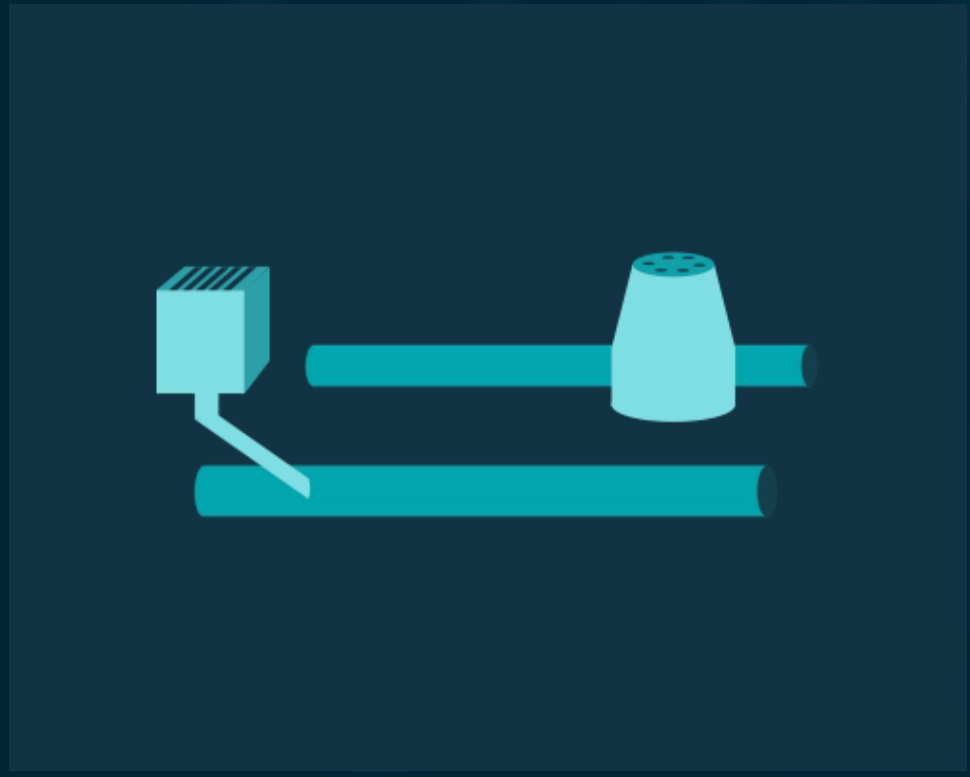


Example 2: Event lasting greater than 8 hours

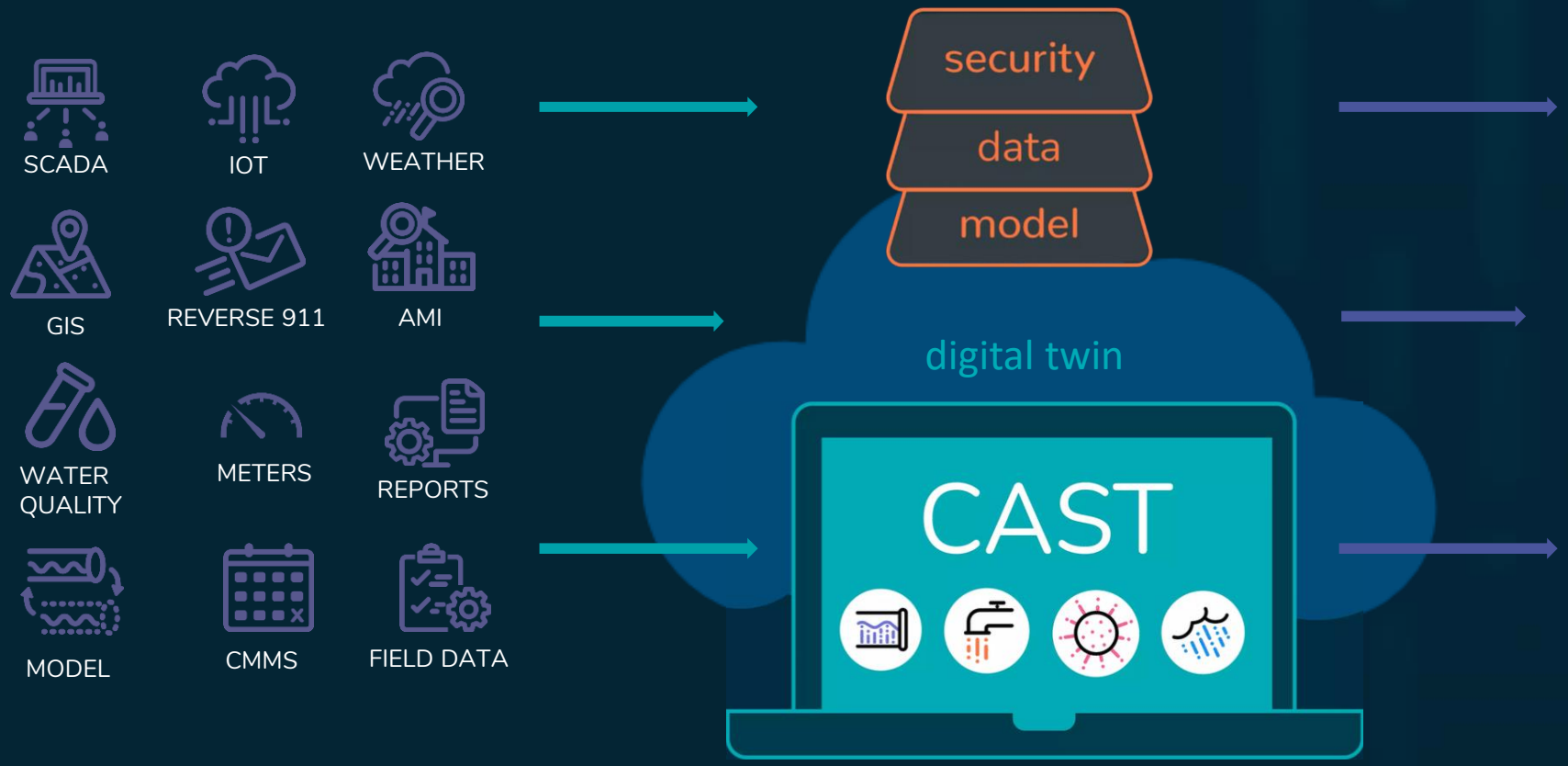


Quick diversion: what is a digital twin?

“A digital twin is a virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to help decision-making.”



Leverage any existing IT infrastructure & data with digital twin to enable cross-functional teams



Management

Automate compliance reporting
Visualize cross-department data

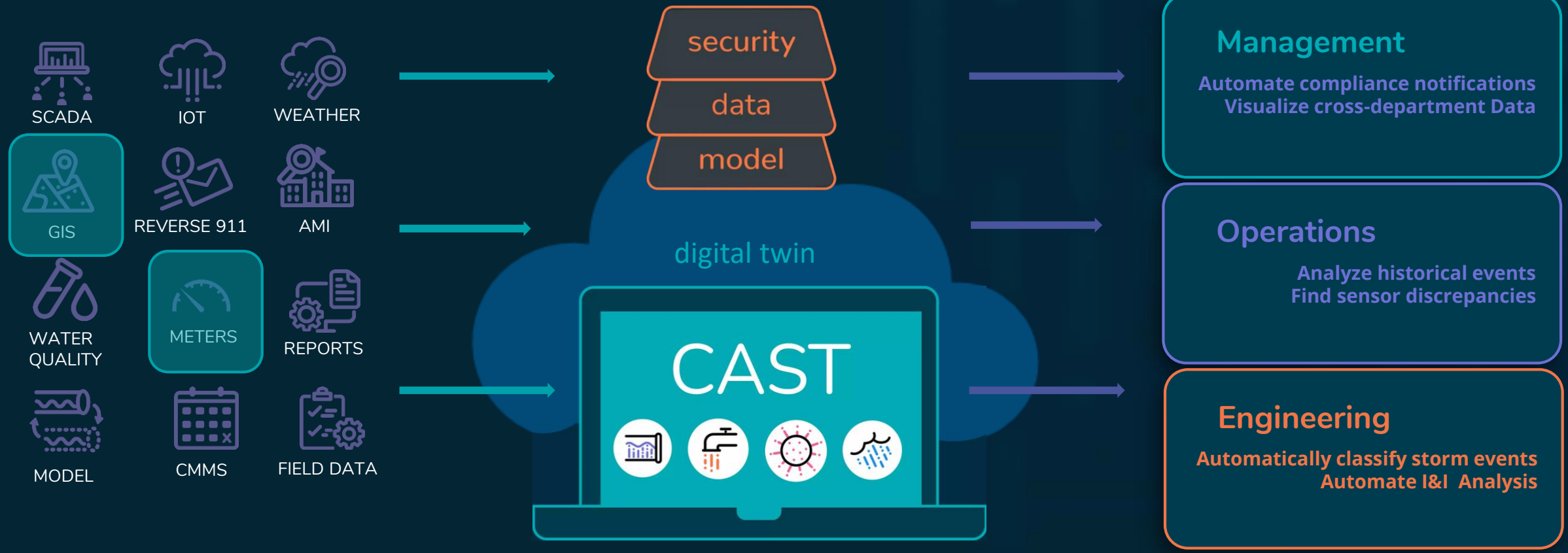
Operations

Streamline O&M
Proactive Overflow Management
Find equipment discrepancies

Engineering

Calibrate/Validate with ease
Plan with the latest data
Automate I&I Analysis

Utilities can start simple with just one or two data layers to address notification regulation



Management

Automate compliance notifications
Visualize cross-department Data

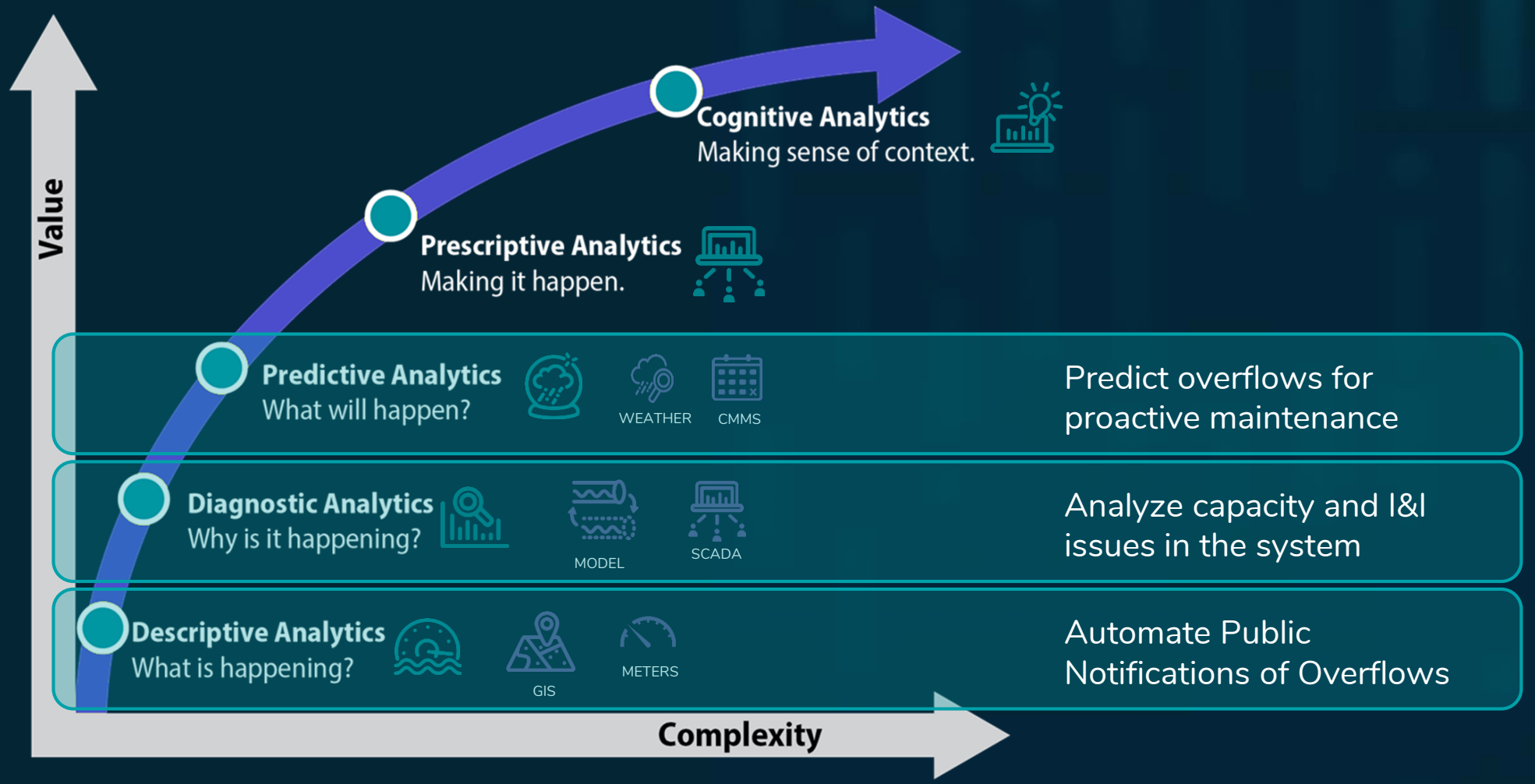
Operations

Analyze historical events
Find sensor discrepancies

Engineering

Automatically classify storm events
Automate I&I Analysis

Where this public advisory notification fits in your digital transformation roadmap



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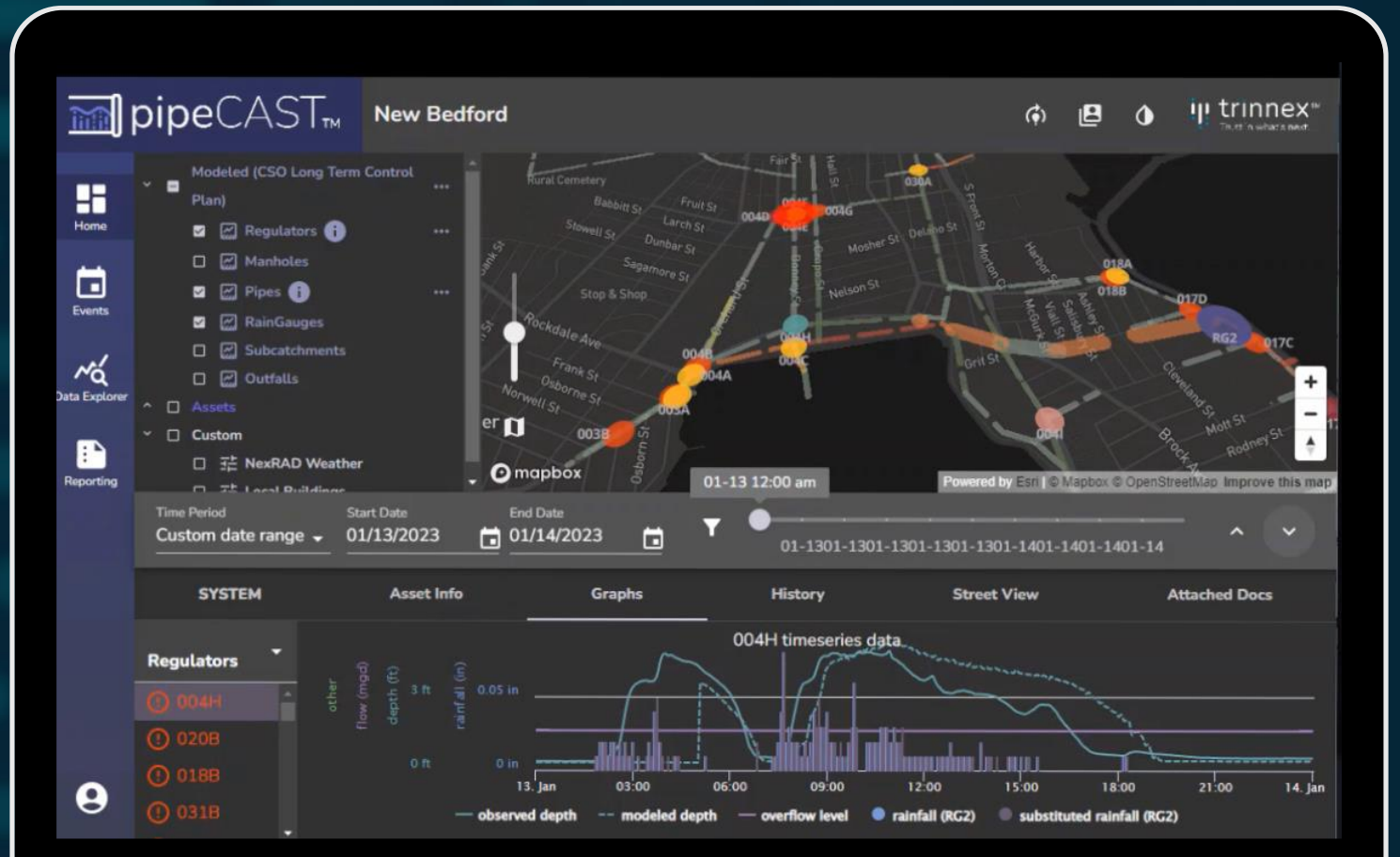
Plug & Play Digital Twin for Sewer Systems



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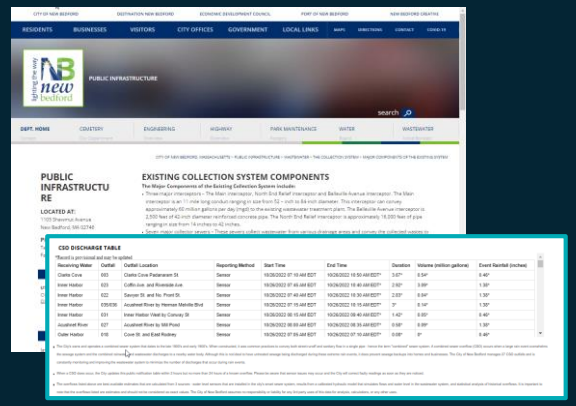
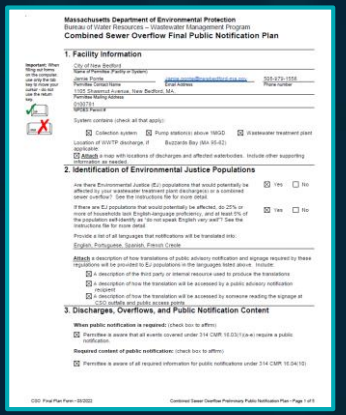
Case Study: City of New Bedford MA

- Population of 100,000
- Earliest sewers date back mid 19th century
- 254 miles of sewer pipe
- 72 CSO Regulators
- 27 CSO Outfalls

New Bedford automated overflow notifications via pipeCAST





Daily Alerts

- Smart alerts based on pipeCAST calculations
- Immediately find anomalies and trouble spots

Update City Website

- Automatic updates with no human intervention
- Built-in validation

Send OnSolve emails

- Reverse 911 automated via pipeCAST API
- Multilingual

Report to DEP

- Manual report
- Data from pipeCAST helps populate report

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View rainfall, overflow depth, simulated results and forecasts in one view

Easily visualize overflow durations in a single plot for any meter

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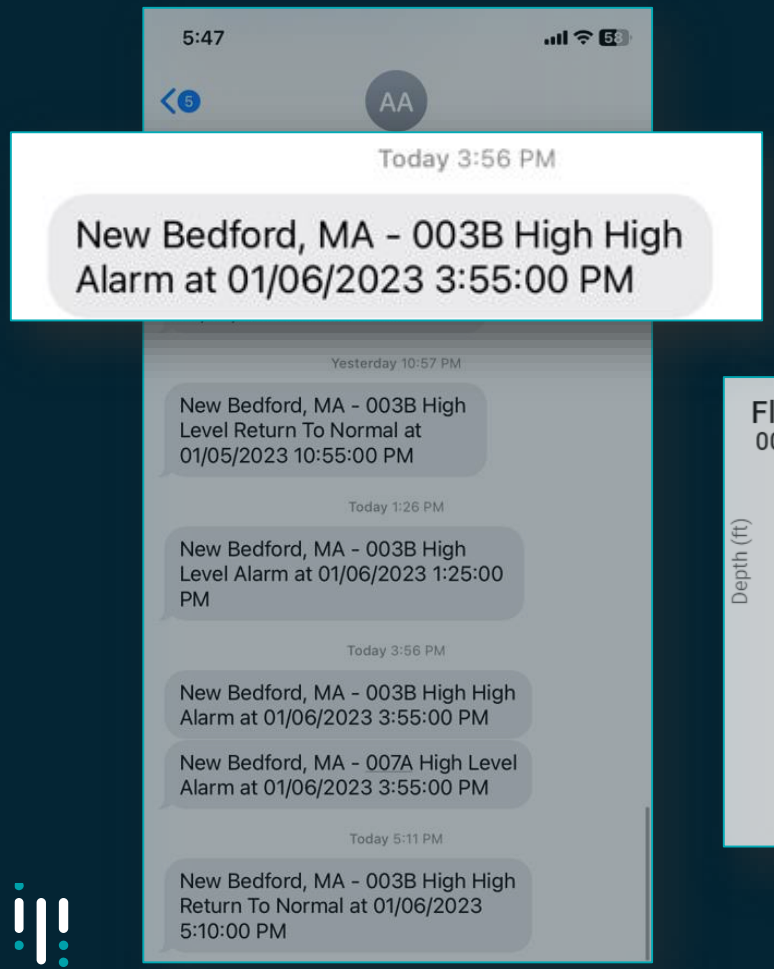
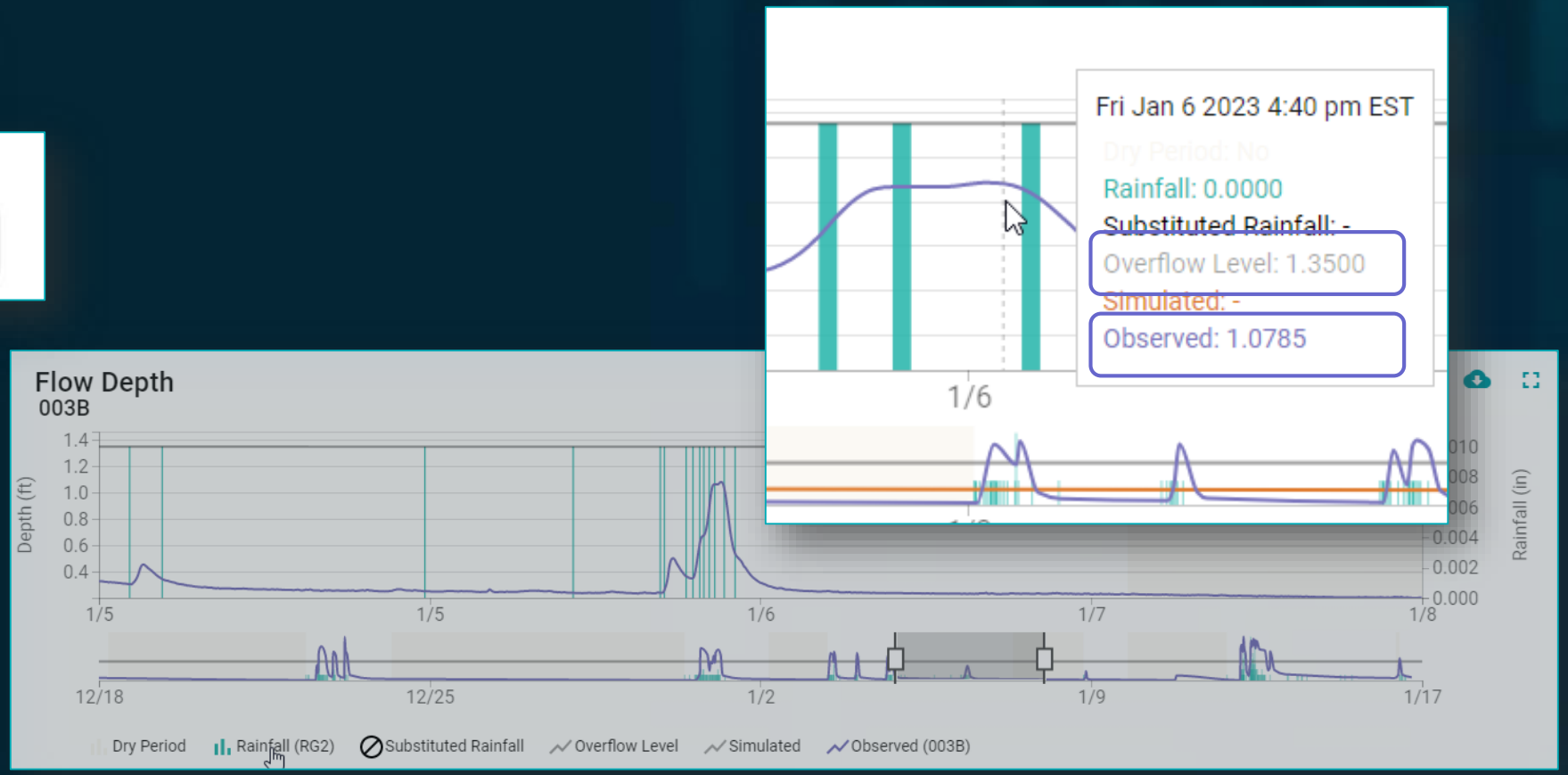
Issue Notice @1:55am

Close Notice @7:15am

1 AM | 2 AM | 3 AM | 4 AM | 5 AM | 6 AM | 7 AM | 8 AM | 9 AM | 10 AM | 11 AM | 12 PM | 1 PM | 2 PM | 3 PM

Meter data sent overflow alarm but pipeCAST corrected and prevented sending a false positive notification





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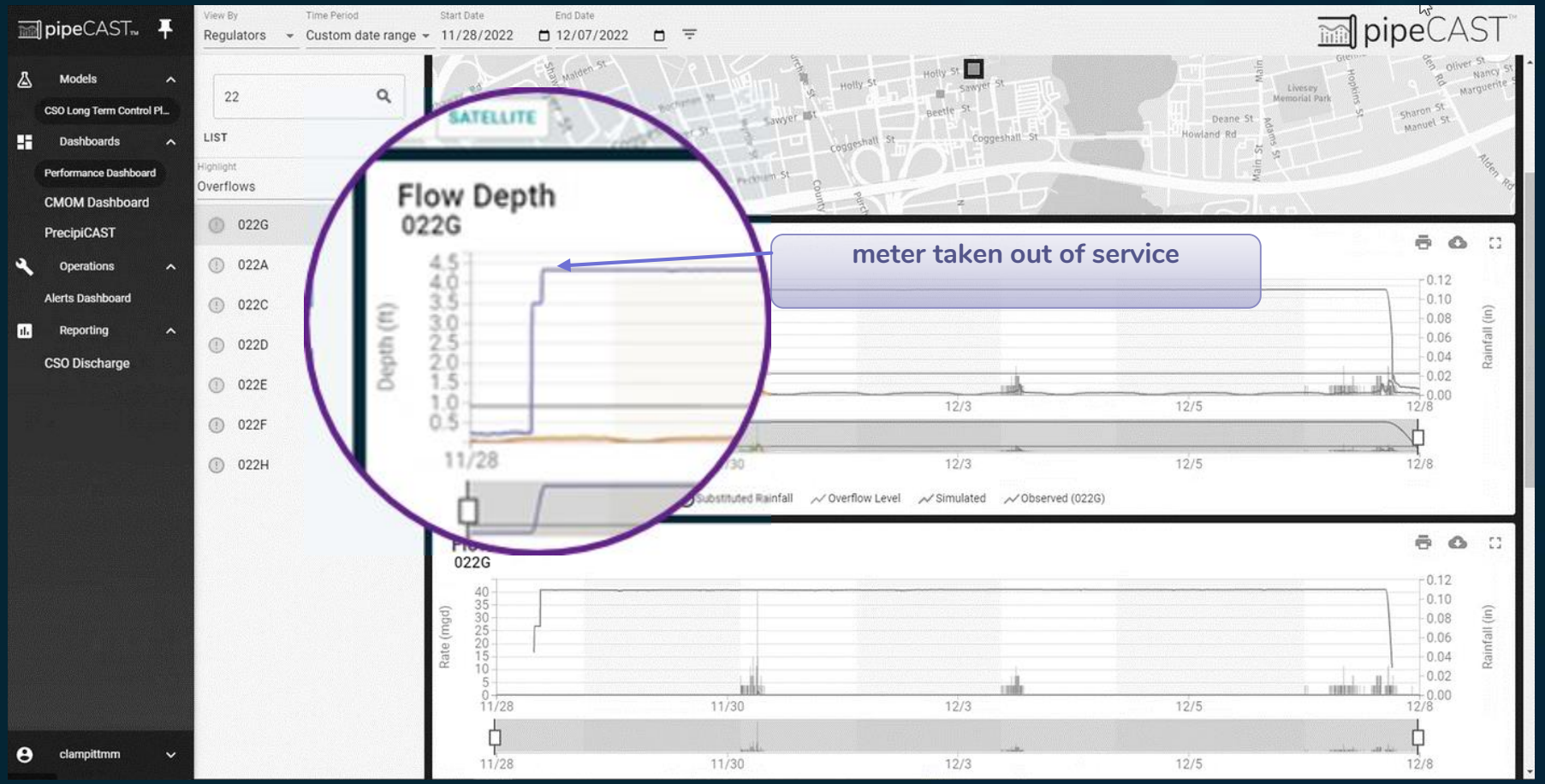
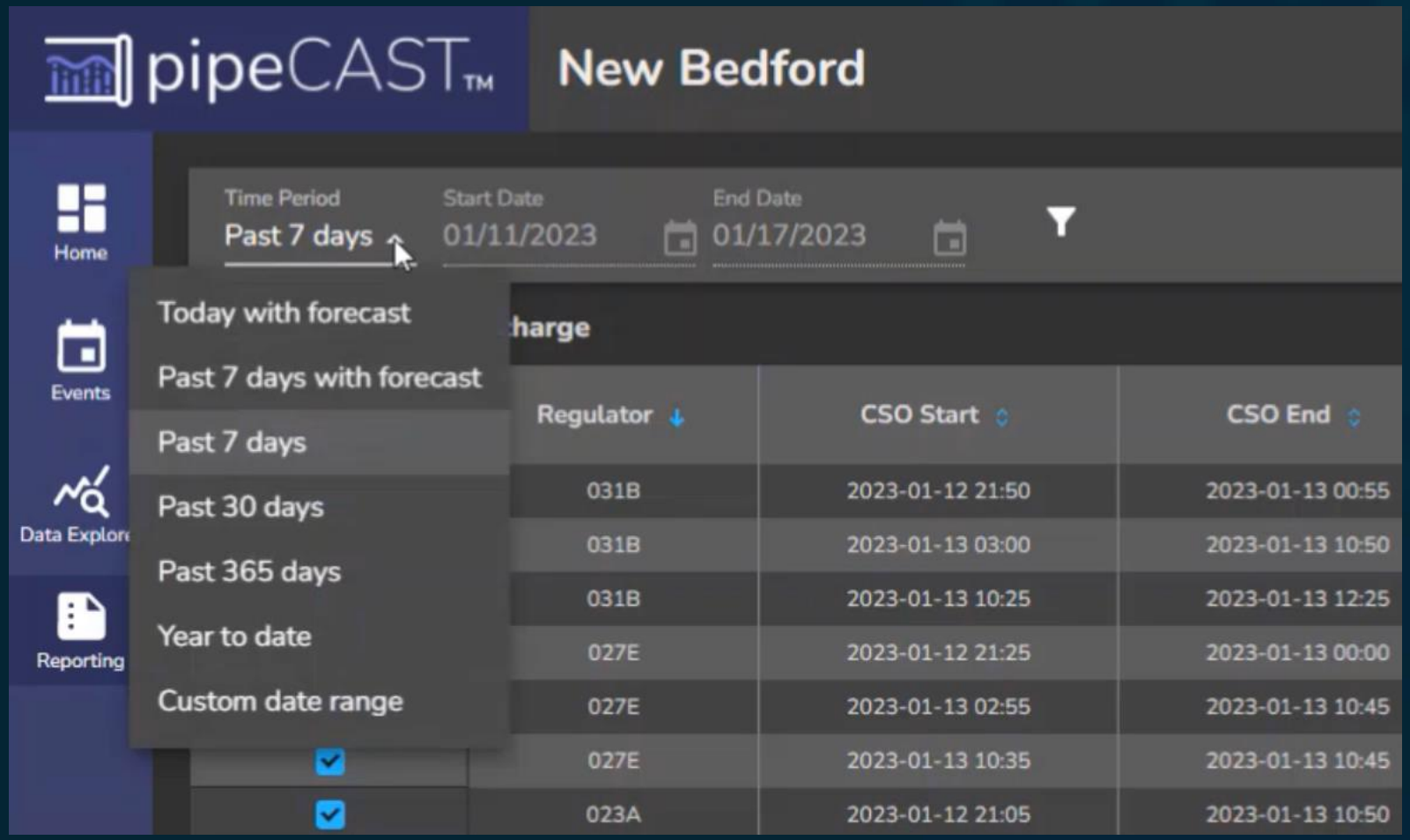
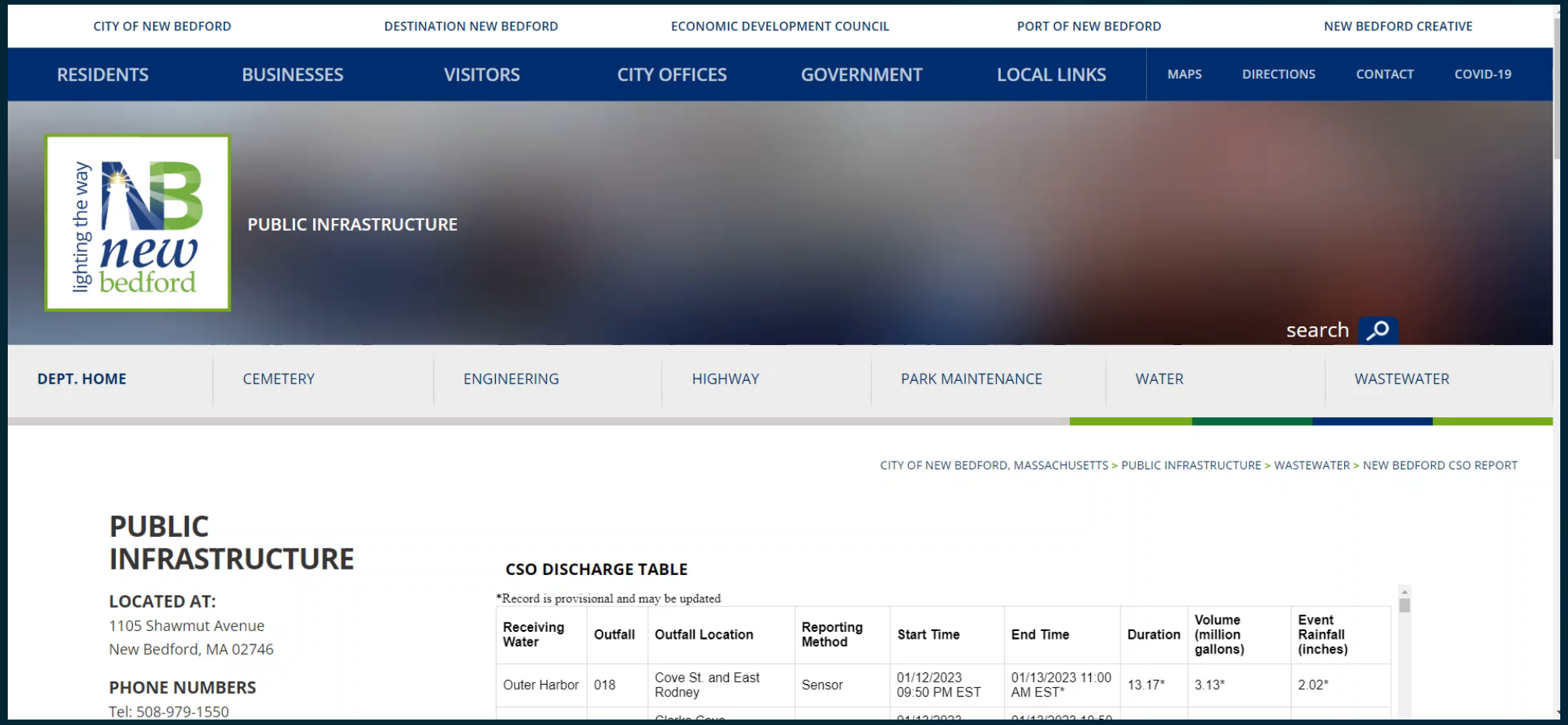
One of the challenges is to be able to identify a maintenance activity vs an actual flooding event



Flexibility in pipeCAST's notification report (include, publish, add comments, etc.)



Seamless integration with City's website



CSO Notifications, here are your options:

Manual Method

- Manual confirmation using overflow “blocks”
- Review meter data to approximate volume
- Rely on humans to provide updates/notices at all hours of the day

Use pipeCAST™

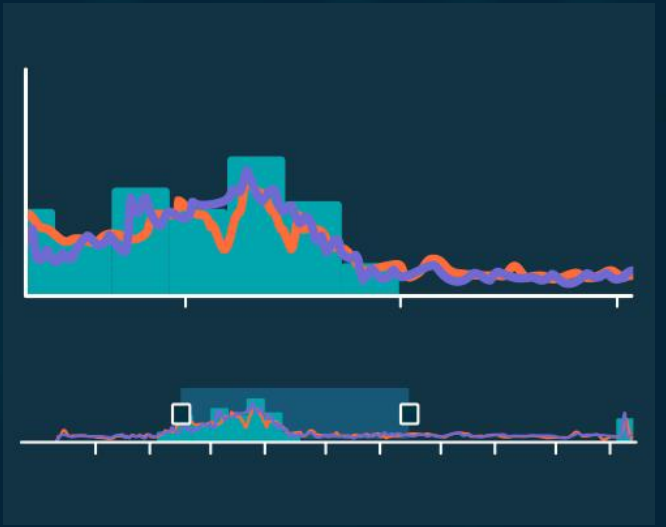
- Leverages existing data and tools
- pipeCAST's cloud platform, data solutions, and cybersecurity
- Plug-and-play with your data so implementation is days not months
- Solid step into a digital twin framework

Build Yourself/DIY

- Data Management
- API connections
- Custom code
- False positives
- Cybersecurity
- Customer Support

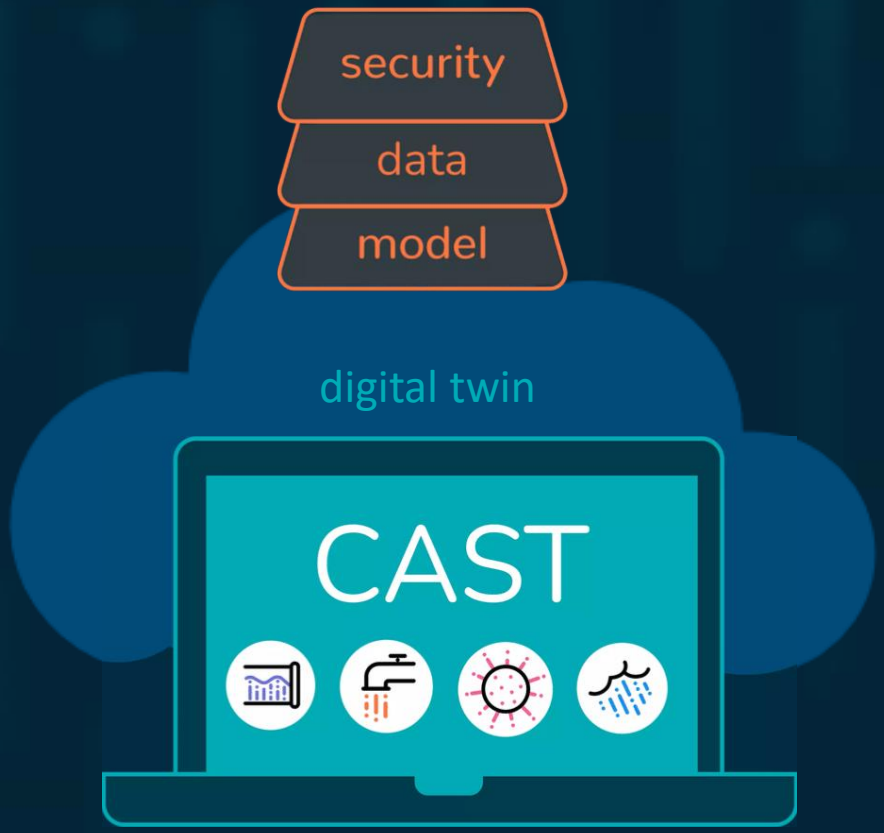
Distinguishing methods to validate and streamline notifications via pipeCAST

- Use the hydraulic model to identify anomalies and verify overflows
- Integrate CMMS and disable a sensor if it is due for maintenance
- Built-in validation rules to rule out false positives
- Forecast overflows to know what's coming and for proactive maintenance



Takeaways

- Finding a near-term win like automating overflow notification will start your utility on the digital transformation path
- Data and process for the notification regulation is complicated
  - False positives, sensor malfunctions, complex logic, custom integrations
- There are many ancillary benefits for automating overflow notifications
  - Validating equipment performance, cross-collaboration, etc.
- Maximizes existing IT & data investments
  - GIS, sensors, models, CMMS, etc.



Thank again to the fantastic team at New Bedford!

Any questions?

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Plug & Play Digital Twin for Sewer Systems